

AMENDMENT

IN THE CLAIMS:

Please amend claim 1 and add new claims 8-15 as follows.

1. (Amended) A DC motor comprising:

 a rotor unit which is rotatably arranged within the motor and has a cylindrical field magnet fixed to holder means into which a rotating shaft is press-fitted at a center thereof, said cylindrical field magnet being magnetized such that S and N poles alternate with each other in a [circuferential] circumferential direction thereof; and

 a stator unit which is circumferentially [arrenged] arranged around said rotor unit and is comprised of a plurality of stator yokes so arranged as to oppose said field magnet with a small gap, each of said stator yokes being formed by circumferentially stacking a large number of thin plates each of which constitutes a salient pole, and a plurality of coil units, each being formed by winding a magnet wire on a bobbin and mounted on each of said stator yokes;

 wherein each of the S and N poles has a plurality of stages formed in an axial direction and shifted from each other in the circumferential direction of said field magnet with a predetermined shift amount.

8. (New claim) A DC motor, comprising:

a rotor unit which is rotatably arranged within the motor and has a cylindrical field magnet fixed to a holder to which a rotating shaft is coupled, said cylindrical field magnet being magnetized such that S and N poles alternate with each other in a circumferential direction thereof; and

a stator unit which is circumferentially arranged around said rotor unit and includes a plurality of stator yokes so arranged as to oppose said field magnet, each of said stator yokes including a large number of circumferentially-stacked thin plates each of which constitutes a salient pole, and a plurality of coil units;

wherein each of the S and N poles has a plurality of stages formed in an axial direction and shifted from each other in the circumferential direction of said field magnet with a predetermined shift amount.

9. (New claim) The DC motor according to claim 8, wherein said rotating shaft is press-fitted at a center of said holder.

10. (New claim) The DC motor according to claim 8, wherein each of said coil units is formed by winding a magnet wire on a bobbin and mounted on each of said stator yokes.

11. (New claim) The DC motor according to claim 8, wherein the shift amount of respective stages falls within a range of 12° to 50° in an electrical angle.

12. (New claim) The DC motor according to claim 8, wherein a rotor position detection element is adjusted by 1/2 the shift amount of respective stages.

13. (New claim) The DC motor according to claim 8, wherein the motor is an inner rotor type brushless DC motor.

14. (New claim) The DC motor according to claim 8, wherein the DC motor is an outer rotor type brushless DC motor.

15. (New claim) The DC motor according to claim 8, wherein the DC motor has three phases, eight poles and six stator units in which a basic degree of a cogging torque thereof is 24.

CLEAN-COPY LIST OF ALL PENDING CLAIMS AS AMENDED HEREIN

1. A DC motor comprising:

a rotor unit which is rotatably arranged within the motor and has a cylindrical field magnet fixed to holder means into which a rotating shaft is press-fitted at a center thereof, said cylindrical field magnet being magnetized such that S and N poles alternate with each other in a circumferential direction thereof; and a stator unit which is circumferentially arranged around said rotor unit and is comprised of a plurality of stator yokes so arranged as to oppose said field magnet with a small gap, each of said stator yokes being formed by circumferentially stacking a large number of thin plates each of which constitutes a salient pole, and a plurality of coil units, each being formed by winding a magnet wire on a bobbin and mounted on each of said stator yokes; wherein each of the S and N poles has a plurality of stages formed in an axial direction and shifted from each other in the circumferential direction of said field magnet with a predetermined shift amount.
2. A DC motor according to claim 1, wherein the shift amount of respective stages falls within a range of 12° to 50° in an electrical angle.
3. A DC motor according to claim 1, wherein a rotor position detection element is adjusted by 1/2 the shift amount of respective stages.

4. A DC motor according to claim 1, wherein the motor is an inner rotor type brushless DC motor.
5. A DC motor according to claim 1, wherein the DC motor is an outer rotor type brushless DC motor.
6. A DC motor according to claim 4, wherein the DC motor has three phases, eight poles and six stator units in which basic degree of a cogging torque thereof is 24.
7. A DC motor according to claim 5, wherein the DC motor has three phases, eight poles and six stator units in which basic degree of a cogging torque thereof is 24.

8. A DC motor, comprising:
 - a rotor unit which is rotatably arranged within the motor and has a cylindrical field magnet fixed to a holder to which a rotating shaft is coupled, said cylindrical field magnet being magnetized such that S and N poles alternate with each other in a circumferential direction thereof; and
 - a stator unit which is circumferentially arranged around said rotor unit and includes a plurality of stator yokes so arranged as to oppose said field magnet, each of said stator yokes including a large number of circumferentially-stacked thin plates each of which constitutes a salient pole, and a plurality of coil units; wherein each of the S and N poles has a plurality of stages formed in an axial direction and shifted from each other in the circumferential direction of said field magnet with a predetermined shift amount.
9. The DC motor according to claim 8, wherein said rotating shaft is press-fitted at a center of said holder.
10. The DC motor according to claim 8, wherein each of said coil units is formed by winding a magnet wire on a bobbin and mounted on each of said stator yokes.
11. The DC motor according to claim 8, wherein the shift amount of respective stages falls within a range of 12° to 50° in an electrical angle.

12. The DC motor according to claim 8, wherein a rotor position detection element is adjusted by 1/2 the shift amount of respective stages.
13. The DC motor according to claim 8, wherein the motor is an inner rotor type brushless DC motor.
14. The DC motor according to claim 8, wherein the DC motor is an outer rotor type brushless DC motor.
15. The DC motor according to claim 8, wherein the DC motor has three phases, eight poles and six stator units in which a basic degree of a cogging torque thereof is 24.